Claims

1. A method to evaluate the toxicity of a candidate compound, which method comprises:

observing the intracellular localization of at least one signal transduction protein in the presence and the absence of the candidate compound;

comparing the intracellular localization pattern in the presence of the candidate compound with the intracellular localization pattern of said signal transduction protein in the presence of a known toxin, whereby similarity of the pattern observed with respect to the candidate compound to that observed for said known toxin identifies said candidate compound as a toxic compound.

2. The method of claim 1 wherein said signal transduction protein is a protein kinase C (PKC) isoenzyme.

3. The method of claim 1 wherein the intracellular localization of at least two signal transduction proteins is determined.

4. The method of claim 3 wherein the intracellular localization of a multiplicity of signal transduction proteins is determined.

5. The method of claim 1 wherein said intracellular localization is observed using a wide-field microscope.

6. The method of claim 1 wherein the intracellular localization is measured by labeling the proteins with specific antibodies or with observable protein extensions.

7. A method to obtain a database of signal transduction protein localization profiles in response to toxic compounds which method comprises

contacting a multiplicity of toxic compounds with at least one cell type,

observing and recording any translocation of at least one signal transduction protein in the presence of each toxic compound, optionally as a function of time,

wherein at least 2 cell types are employed and/or

the translocation of at least 2 signal transduction proteins is observed and/or

wherein the translocation is observed as a function of time; and

recording the observations of translocation in computer-readable and retrievable form.

8. The method of claim 7 wherein said signal transduction protein is a protein kinase C (PKC) isoenzyme.

9. The method of claim 7 wherein the intracellular localization of at least two signal transduction proteins is determined.

10. The method of claim 9 wherein the intracellular localizations of a multiplicity of signal transduction proteins is determined.

11. The method of claim 7 wherein said translocation is observed using a wide-field microscope.

12. The method of claim 7 wherein the translocation is measured by labeling the proteins with specific antibodies.

13. A computer-readable database prepared by the method of claim 7.

14. A method to evaluate the efficacy of a candidate antidote for a toxic compound which method comprises:

observing the intracellular localization of at least one signal transduction protein in the presence and absence of the toxin for which the antidote is being tested so as to ascertain the localization pattern under toxic conditions (in the presence of toxin) and under normal conditions (in the absence of toxin);

observing the intracellular localization of said at least one signal transduction protein in the presence of both the toxin and the candidate compound;

comparing the localization pattern under toxic conditions in the presence of candidate compound to the patterns under toxic and normal conditions;

whereby a candidate compound whose presence under toxic conditions restores the localization pattern to a pattern more closely resembling that under normal conditions is identified as an antidote to the toxin.

15. The method of claim 14 wherein the intracellular localization of at least two signal transduction proteins is determined.

16. The method of claim 15 wherein the intracellular localization of a multiplicity of signal transduction proteins is determined.

17. A method to identify a treatment protocol for a disease condition which method comprises identifying a cellular function the inhibition of which would ameliorate said disease condition,

observing the intracellular localization of at least one signal transduction protein in the presence and the absence of a candidate compound;

comparing the intracellular localization pattern in the presence of the candidate compound with the intracellular localization pattern of said signal transduction protein in the presence of a known inhibitor compound, whereby similarity of the pattern observed with respect to the candidate compound to that observed for said known inhibitor compound identifies said candidate compound as able to inhibit said cellular function, thus identifying said compound as a medicament to ameliorate the condition.

18. A method to identify a toxin which effects a cellular response characteristic of a disease condition which method comprises

obtaining an intracellular localization profile of a multiplicity of signal transduction proteins in the presence of a candidate toxin as compared to said profile in the absence of said toxin;

obtaining an intracellular localization profile of said multiplicity of signal transduction proteins in the presence of said disease condition as compared to said profile in the absence of said disease condition;

comparing the profile in the presence of said candidate toxin with the profile of said disease condition;

whereby a similarity of said profiles identifies said toxin as inducing a condition similar to said disease.

19. A method to evaluate a therapeutic protocol for the treatment of a disease condition which method comprises

providing a localization profile of a multiplicity of signal transduction proteins characteristic of said disease condition;

administering said protocol to cells or tissues exhibiting said profile characteristic of the disease condition; and

observing the effect of said therapeutic protocol on said profile, whereby a therapeutic protocol which results in conversion of said profile to a profile more closely similar to that of normal cells identifies said protocol as an effective protocol.

20. A method to identify a set of signal transduction proteins whose intracellular localization is useful to determine perturbations from normal cellular status which method comprises

arbitrarily identifying an additional set of signal transduction proteins;

determining the changes in intracellular localization in response to an initial set of arbitrarily chosen compounds which modify the status of the intracellular environment with respect to said initial set of signal transduction proteins;

comparing the changes in intracellular localization obtained among members of the initial set of signal transduction proteins and compounds;

discarding compounds and/or signal transduction proteins which result in redundant intracellular translocation information;

substituting additional provisional signal transduction proteins and compounds for the proteins and compounds discarded to obtain a second set of proteins and a second set of compounds;

obtaining intracellular localization information for the second set of compounds with respect to the second set of proteins;

again comparing the intracellular localization information obtained among members of the initial set of signal transduction proteins and compounds, and

discarding compounds and proteins that result in redundant profiles; and

repeating the foregoing steps until a set of proteins is obtained which provides at least five principal components with respect to the range of compounds marketed as small organic molecules.